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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/023,365	12/14/2001	Tenjo Umemoto	40222.0003USC1	2747
23352	7590	11/21/2003	EXAMINER	
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			ART UNIT	PAPER NUMBER
			1753	

DATE MAILED: 11/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/023,365

Applicant(s)

UMEMOTO, TERUO

Examiner

Edna Wong

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 27-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4/22/02. 6) ☐ Other:

***Election/Restrictions***

Applicant's election of Group I, claims **1-26**, in the response dated October 20, 2003 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Accordingly, claims **27-32** are withdrawn from consideration as being directed to a non-elected invention.

The requirement is still deemed proper and is therefore made FINAL.

***Oath/Declaration***

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because the parent application, US Patent Application No. 09/939,141, should be listed under the section 35 USC 120.

***Specification***

I. The abstract of the disclosure is objected to because the word "cycloppentanone" in line 10 should be amended to the word -- cyclopentanone --. Correction is required. See MPEP § 608.01(b).

II. The disclosure is objected to because of the following informalities:  
page 1, line 6, the word -- , pending, -- should be inserted after the number  
"2001".

page 13, line 18, the word -- be -- should be inserted after the word "should".

Appropriate correction is required.

#### ***Claim Objections***

Claim 5 is objected to because of the following informalities:

##### Claim 5

line 3, the word "tetrahydrofuan" should be amended to the word --  
tetrahydrofuran --.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

Claims 1-26 are rejected under 35 U.S.C. 112, second paragraph, as being  
indefinite for failing to particularly point out and distinctly claim the subject matter which  
applicant regards as the invention.

##### Claim 1

lines 11-12, "the electrolytic mixture comprising an ester and an electrolyte" lacks

antecedent basis.

Also, if this electrolyte mixture is the same as the one recited in claim 1, lines 5-7, then the word "an" in front of the words "ester" and "electrolyte" should be amended to the word -- the --.

#### Claim 2

lines 1-2, "the polymer the first electrolysis is deposited" lacks antecedent basis. Claim 1 does not recite that the polymer is deposited on one or more of the electrodes.

Also, it appears that "the polymer the first electrolysis is deposited" is the same as the resultant polymer recited in claim 1, line 8. However, it is unclear if it is.

line 2, it appears that the "electrodes in the second electrolysis" are the same as the two or more electrodes recited in claim 1, lines 9-10. However, it is unclear if they are. If they are, then it is suggested that the word -- the -- be inserted after the word "as".

#### Claim 19

line 1, "the aromatic compound" lacks antecedent basis.

lines 1-2, it appears that the "at least one cyclopentane structure condensed with at least two aromatic rings" is the same as that recited in claim 1, line 2. However, it is

unclear if it is.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **1-20** are rejected under 35 U.S.C. 102(b) as being anticipated by **Rault-Berthelot et al.** ("The Polyfluorenes: A Family of Versatile Electroactive Polymers (I). Electropolymerization of Fluorenes", *New Journal of Chemistry* (1986), Vol. 10, No. 3, pp. 169-177).

Rault-Berthelot teaches a method for the production of a polymer having at least one unit that contains at least one cyclopentanone structure condensed with at least two aromatic rings, the method comprising the steps of:

(a) a first electrolysis (= anodic sweep) wherein an electric current is passed between two or more electrodes immersed in an electrolytic mixture comprising an ester (= propylene carbonate), an electrolyte (= KPF<sub>6</sub>) and an aromatic compound having at least one cyclopentane structure condensed with at least two aromatic rings (= fluorene);

(b) harvesting the resultant polymer from the first electrolysis (= accumulation = deposit on the platinum anode); and

(c) a second electrolysis (= cathodic sweep) wherein an electric current is passed between two or more electrodes immersed in an electrolytic mixture, one or more of the electrodes including the harvested polymer from the first electrolysis, and the electrolytic mixture comprising an ester and an electrolyte (pages 169-170, "Experimental" and "Chemicals"; and Table 1).

One or more of the electrodes on which the polymer from the first electrolysis is deposited are used as electrodes in the second electrolysis (= cyclic voltammetry) [pages 170-172, "Experimental results"].

The electrolyte in the electrolytic mixture of the first and second electrolysis are selected from the group consisting of  $\text{LiPF}_6$ ,  $\text{NaPF}_6$ ,  $\text{KPF}_6$ ,  $\text{LiBF}_4$ ,  $\text{KBF}_4$ ,  $(\text{CH}_3)_4\text{NPF}_6$ ,  $(\text{C}_2\text{H}_5)_4\text{NPF}_6$ ,  $(\text{C}_2\text{H}_5)_4\text{NBF}_4$ , and mixtures thereof (=  $\text{Bu}_4\text{NBF}_4$  and  $\text{KPF}_6$ ) [page 170, "Chemicals"; and Table 1].

The electrolytic mixture of the first electrolysis further comprises a solvent (= propylene carbonate) [page 170, "Chemicals"; and Table 1].

The electrolytic mixture of the second electrolysis further comprises a solvent (= propylene carbonate) [page 170, "Chemicals"; and Table 1].

The ester of the first or second electrolysis is selected from the group consisting of a simple ester, a carbonic ester, a lactone, a complex ester, and mixtures thereof (= propylene carbonate) [page 170, "Chemicals"; and Table 1].

The ester is a carbonic ester selected from the group consisting of ethylene, carbonate, propylene carbonate, butylenes carbonate, dimethyl carbonate, diethyl

carbonate, ethyl methyl carbonate, and mixtures thereof (= propylene carbonate) [page 170, "Chemicals"; and Table 1].

The first electrolysis further comprising a reference electrode for voltage control (pages 169-170, "Experimental").

The second electrolysis further comprises a reference electrode for voltage control (pages 169-170, "Experimental").

At least one of the electrodes in the first or second electrolysis is platinum, nickel, stainless steel, copper, carbon,  $\text{PbO}_2$ , titanium coated with platinum or titanium coated with  $\text{PbO}_2$  (= platinum anode and vitreous carbon cathode) [pages 169-170, "Experimental"].

Rault-Berthelot does not teach wherein the solvent is selected from the group consisting of acetonitrile, propionitrile, benzonitrile, nitromethane, nitroethane, nitrobenzene, tetrahydrofuran, diethyl ether, dimethoxyethane, dioxane, dichloromethane, dichloroethane, benzene, toluene, chlorobenzene, fluorobenzene, and mixtures thereof.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one skilled in the art would have been motivated to have modified the method of Rault-Berthelot with wherein the solvent is selected from the group consisting of acetonitrile, propionitrile,



benzonitrile, nitromethane, nitroethane, nitrobenzene, tetrahydrofuran, diethyl ether, dimethoxyethane, dioxane, dichloromethane, dichloroethane, benzene, toluene, chlorobenzene, fluorobenzene, and mixtures thereof because the solvent is a result-effective variable and one skilled in the art has the skill to determine the solvent that would carry out the desired reaction, e.g., different organic compounds dissolve in different organic solvents, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

Furthermore, Rault-Berthelot teaches acetonitrile as a solvent (page 170, "Chemicals").

As to wherein the ester is a simple ester selected from the group consisting of methyl formate, ethyl formate, methyl acetate, ethyl acetate, methyl propionate, ethyl propionate, methyl butylate, and mixtures thereof; and wherein the ester is a lactone selected from the group consisting of  $\beta$ -propiolactone,  $\gamma$ -butyrolactone,  $\delta$ -valerolactone,  $\epsilon$ -caprolactone, and mixtures thereof, the ester is a result-effective variable and one skilled in the art has the skill to determine the ester that would carry out the desired reaction, e.g., nucleophilic substitution of the cyclopentane structure, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

As to wherein the ester of the first electrolysis is at least 20% by volume of the electrolytic mixture; and wherein the ester of the second electrolysis is at least 20% by

volume of the electrolytic mixture, the ester disclosed by Rault-Berthelot inherently has a volume. Although the volume is not disclosed, the volume is a result-effective variable and one skilled in the art has the skill to calculate the volume that would determine the success of the desired reaction to occur, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

As to wherein the electrolyte of the first electrolysis is at a concentration of from 0.001 to 1 mol/L; and wherein the electrolyte of the second electrolysis is at a concentration of from 0.001 to 1 mol/L, the electrolyte disclosed by Rault-Berthelot inherently has a concentration. Although the concentration is not disclosed, the concentration is a result-effective variable and one skilled in the art has the skill to calculate the concentration that would determine the success of the desired reaction to occur, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

As to wherein the aromatic compound having at least one cyclopentane structure condensed with at least two aromatic rings of the first electrolysis is at a concentration of from 0.01 to 10 mol/L, the aromatic compound disclosed by Rault-Berthelot inherently has a concentration. Although the concentration is not disclosed, the concentration is a result-effective variable and one skilled in the art has the skill to calculate the concentration that would determine the success of the desired reaction to occur, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

As to wherein the polymer having at least one unit that contains at least one cyclopentanone structure condensed with at least two aromatic rings is poly(9-fluorenone) and the aromatic compound having at least one cyclopentane structure condensed with at least two aromatic rings is fluorene, Rault-Berthelot teaches a similar process. Similar processes can reasonably be expected to yield products which inherently have the same properties. *In re Spada* 15 USPQ 2d 1655 (CAFC 1990); *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155 (CCPA 195).

***Allowable Subject Matter***

The following is a statement of reasons for the indication of allowable subject matter:

Claim **21** defines over the prior art of record because the prior art does not teach or suggest the method of claim 1 wherein the polymer having at least one unit that contains at least one cyclopentanone structure condensed with at least two aromatic rings is poly(cyclopenta[def]phenanthren-4-one) and the aromatic compound having at least one cyclopentane structure condensed with at least two aromatic rings is 4H-cyclopenta[def]phenanthrene.

Claim **22** defines over the prior art of record because the prior art does not teach or suggest the method of claim 1 wherein the polymer having at least one unit that contains at least one cyclopentanone structure condensed with at least two aromatic rings is poly(8H-cyclopenta[def]fluoren-4-one) and the aromatic compound having at

least one cyclopentane structure condensed with at least two aromatic rings is 4,8-dihydrocyclopenta[def]fluorene.

Claim **23** defines over the prior art of record because the prior art does not teach or suggest the method of claim 1 wherein the polymer having at least one unit that contains at least one cyclopentanone structure condensed with at least two aromatic rings is poly(cyclopenta[def]fluoren-4,8-dione) and the aromatic compound having at least one cyclopentane structure condensed with at least two aromatic rings is 4,8-dihydrocyclopenta[def]fluorene.

Claim **24** defines over the prior art of record because the prior art does not teach or suggest the method of claim 1 wherein the polymer having at least one unit that contains at least one cyclopentanone structure condensed with at least two aromatic rings is poly(benzo[b]fluoren-11-one) and the aromatic compound having at least one cyclopentane structure condensed with at least two aromatic rings is 11H-benzo[b]fluorene.

Claim **25** defines over the prior art of record because the prior art does not teach or suggest the method of claim 1 wherein the polymer having at least one unit that contains at least one cyclopentanone structure condensed with at least two aromatic rings is poly(dibenzo[b,h]fluorene-12-one) and the aromatic compound having at least one cyclopentane structure condensed with at least two aromatic rings is 12H-benzo[b,h]fluorene.

Claim **26** defines over the prior art of record because the prior art does not teach

or suggest the method of claim 1 wherein the polymer having at least one unit that contains at least one cyclopentanone structure condensed with at least two aromatic rings is poly(indeno[1,2-*b*]fluorene-6,12-dione) and the aromatic compound having at least one cyclopentane structure condensed with at least two aromatic rings is 6,12-dihydro-indeno[1,2-*b*]fluorene.

The prior art does not contain any language that teaches or suggests the above. Therefore, a person skilled in the art would not have been motivated to adopt the above conditions, and a prima facie case of obviousness cannot be established.

Claims **21-26** would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

### ***Citations***

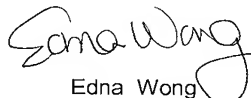
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

**Rault-Berthelot et al.** ("The Anodic Oxidation of Fluorene and Some of Its Derivatives. Conditions for the Formation of A New Conducting Polymer", *J. of Electroanal. Chem. and Interfacial Electrochem.* (1985), Vol. 182, No. 1, pp. 187-192) is cited to teach that fluorene, 9-methylfluorene and 9,9'-dimethylfluorene were polymerized by electrochemical oxidation (abstract).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (703) 308-3818. The examiner can normally be reached on Mon-Fri 7:30 am to 5:00 pm, alt. Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (703) 308-3322. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1495.

  
Edna Wong  
Primary Examiner  
Art Unit 1753

EW  
November 15, 2003